


6:20-cv-00348


EXHIBIT B

PRELIMINARY CLAIM CHART (Subject to supplementation and amendment based on acquisition of further information)

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
8. An apparatus comprising: a detection circuit configured to generate a signal having on event condition; and	<p>The accused product utilizes an apparatus comprising: a detection circuit (e.g., a battery monitoring circuit) configured to generate a signal (e.g., voltage or current notification) having on event condition (e.g., if state is high or low).</p> <p>As shown below, the Motorola Moto Z3 utilizes a Qualcomm Snapdragon 835 processor.</p>

Pat. 6,819,539	<div><div>Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")</div><div><div><div>verizon</div><div>Wireless In Home Business</div><div>Phones Plans Deals Shop Support 5G</div></div><div><div>Stores</div><div>Spanish</div><div>Sign in</div></div></div><div><div>Features Specs Reviews FAQs Accessories</div><div>Chat</div></div><div><div>Home / Smartphones / Motorola</div><div><h1>Motorola moto z³</h1><div>★★★★☆ (286 Reviews)</div><div>No longer available for purchase.</div><div>Accelerate your mobile experience with the moto z³, the world's first smartphone that can be upgraded to 5G using moto mods.¹ Talk, text and chat for See More</div><div><div>Device Support</div><div>Trade-in my device</div></div><div>Shop the latest Motorola devices</div><div>https://www.verizon.com/smartphones/moto-z3/#specsHeading</div></div><div><div><div>Chat with us</div></div></div></div></div>
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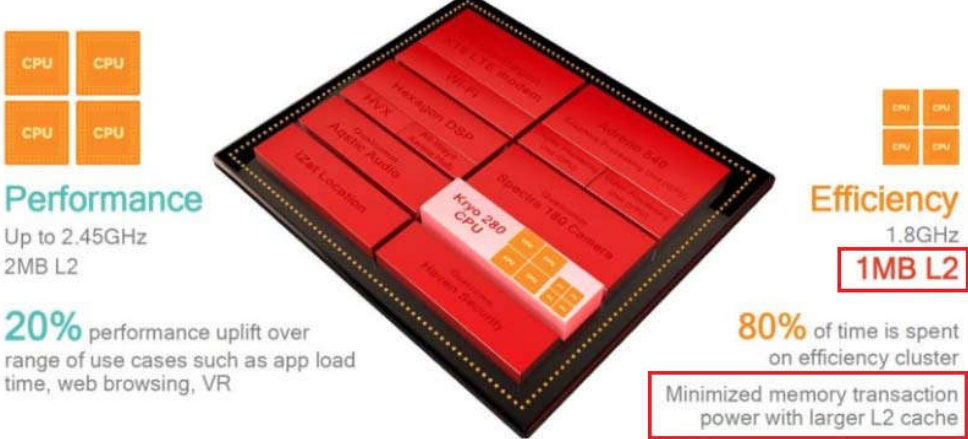
Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")												
	<table> <tr> <td data-bbox="451 625 673 646">Colors</td><td data-bbox="690 625 1328 646">Ceramic Black</td></tr> <tr> <td data-bbox="451 682 495 703">SAR</td><td data-bbox="690 682 1328 724">Head 1.11W/kg Body 1.18 W/kg</td></tr> <tr> <td data-bbox="451 745 576 787">Hearing Aid Compatibility</td><td data-bbox="690 745 1328 766">M3/T4</td></tr> <tr> <td data-bbox="451 829 527 850">Network</td><td data-bbox="690 829 1328 871">4G LTE (B2, 4, 5, 7, 13, 20, 28, 66) CDMA: (BC0, 1) GSM/GPRS/EDGE (B2, 3, 5, 8 MHz) UMTS/HSPA+ (B1, 2, 5, 8)</td></tr> <tr> <td data-bbox="451 913 544 934">Processor</td><td data-bbox="690 913 1198 955">Octa-core 2.35 GHz, Qualcomm® Snapdragon™ 835</td></tr> <tr> <td data-bbox="451 976 625 1018">HD Voice with Video Calling</td><td data-bbox="690 976 1328 1018">Y</td></tr> </table> <div data-bbox="454 1087 747 1155"> <p>Compare devices</p> </div> <hr/> <p data-bbox="467 1218 852 1249">Motorola moto z³ Support</p> <p data-bbox="467 1276 1263 1333">Verizon Wireless Support helps you better understand your Verizon mobile device and other Verizon services. Motorola moto z³ Support</p> <p data-bbox="438 1365 1068 1396">https://www.verizon.com/smartphones/moto-z3/#specsHeading</p>	Colors	Ceramic Black	SAR	Head 1.11W/kg Body 1.18 W/kg	Hearing Aid Compatibility	M3/T4	Network	4G LTE (B2, 4, 5, 7, 13, 20, 28, 66) CDMA: (BC0, 1) GSM/GPRS/EDGE (B2, 3, 5, 8 MHz) UMTS/HSPA+ (B1, 2, 5, 8)	Processor	Octa-core 2.35 GHz, Qualcomm® Snapdragon™ 835	HD Voice with Video Calling	Y
Colors	Ceramic Black												
SAR	Head 1.11W/kg Body 1.18 W/kg												
Hearing Aid Compatibility	M3/T4												
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Processor	Octa-core 2.35 GHz, Qualcomm® Snapdragon™ 835												
HD Voice with Video Calling	Y												

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<p data-bbox="441 716 1482 772">As shown below, the Snapdragon 835 includes a battery monitoring circuit that generates a signal based upon the occurrence of a certain condition (in this case voltage variances for normal values).</p> <div data-bbox="469 812 578 919">The Qualcomm Snapdragon logo, featuring a red stylized 'S' icon above the text 'Qualcomm' and 'snapdragon' in a sans-serif font.</div> <p data-bbox="613 835 1437 898">Snapdragon 835 Mobile Platform</p> <p data-bbox="441 934 1146 961">https://www.qualcomm.com/products/snapdragon-835-mobile-platform</p>

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<p data-bbox="841 611 1057 653">Snapdragon 835 mobile platform advancements:</p> <ul data-bbox="841 674 1081 1157" style="list-style-type: none"><li data-bbox="841 674 1081 751">+ Snapdragon X16 LTE modem: mobile connectivity with LTE download speeds up to 1 Gbps, multi-gigabit 802.11ad, and integrated 2x2 802.11ac Wi-Fi with MU-MIMO<li data-bbox="841 762 1081 840">+ Qualcomm® Quick Charge™ 4 technology: 20% faster, 30% more efficient than our previous generation, charge from zero to up to 50% in 15 minutes²<li data-bbox="841 850 1081 928">+ Qualcomm® Adreno™ 540 GPU with visual processing subsystem: Advanced 3-D graphics rendering and up to 60X more colors help deliver life-like visuals for immersive experiences¹<li data-bbox="841 938 1081 1016">+ Qualcomm Spectra™ 180 Camera ISP: Dual 14-bit ISPs support up to 32MP single or dual 16MP cameras for the ultimate photography and videography experience<li data-bbox="841 1026 1081 1157">+ Qualcomm® Hexagon™ 682 DSP: Support for latest Machine Learning frameworks and image processing. Includes Hexagon Vector eXtensions and Qualcomm All-Ways Aware™ technology utilizing connectivity and sensors <p data-bbox="443 1182 1463 1209">https://www.qualcomm.com/media/documents/files/snapdragon-835-mobile-platform-product-brief.pdf</p>

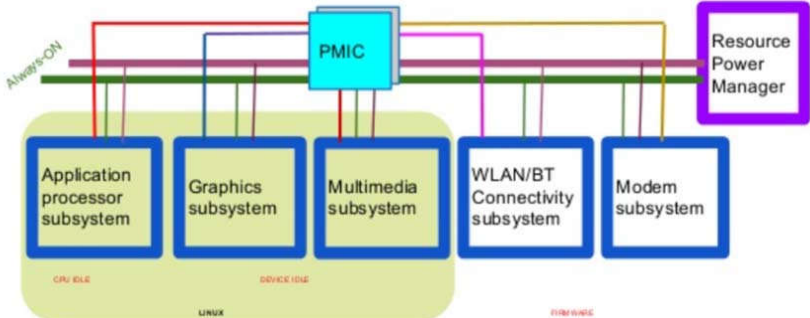
Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<pre> 5006. qcom,bcl { 5007. compatible = "qcom,bcl"; 5008. qcom,bcl-enable; 5009. qcom,bcl-framework-interface; 5010. qcom,bcl-freq-control-list = <0x1a 0x1b 0x1c 0x1d>; 5011. qcom,bcl-hotplug-list = <0x1a 0x1b 0x1c 0x1d>; 5012. qcom,bcl-soc-hotplug-list = <0x1a 0x1b 0x1c 0x1d>; 5013. 5014. qcom,ibat-monitor { 5015. qcom,low-threshold-uamp = <0x33e140>; 5016. qcom,high-threshold-uamp = <0x401640>; 5017. qcom,mitigation-freq-khz = <0x8ca00>; 5018. qcom,vph-high-threshold-uv = <0x3567e0>; 5019. qcom,vph-low-threshold-uv = <0x325aa0>; 5020. qcom,soc-low-threshold = <0xa>; 5021. qcom,thermal-handle = <0xa0>; 5022. }; 5023. }; </pre> <p>https://pastebin.com/U0i7nP4P</p>

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<pre> 564 bcl->btm_vph_adc_param.btm_ctx = bcl; 565 bcl->btm_vph_adc_param.threshold_notification = bcl_vph_notification; 566 bcl->btm_vph_adc_param.channel = bcl->btm_vph_chan; 1381 bcl->btm_ibat_adc_param.btm_ctx = bcl; 1382 bcl->btm_ibat_adc_param.threshold_notification = bcl_ibat_notification; 1383 bcl->btm_ibat_adc_param.channel = bcl->btm_ibat_chan; 536 static void bcl_ibat_notification(enum qnpn_tm_state state, void *ctx); 537 static void bcl_vph_notification(enum qnpn_tm_state state, void *ctx); </pre> <p>https://android.googlesource.com/kernel/msm/+refs/heads/android-msm-angler-3.10-nougat/drivers/power/battery_current_limit.c</p> <pre> 707 enum qnpn_tm_state { 708 ADC_TM_HIGH_STATE = 0, 709 ADC_TM_COOL_STATE = ADC_TM_HIGH_STATE, 710 ADC_TM_LOW_STATE, 711 ADC_TM_WARM_STATE = ADC_TM_LOW_STATE, 712 ADC_TM_STATE_NUM, 713 }; </pre> <p>https://android.googlesource.com/kernel/msm/+refs/heads/android-msm-asus-3.10-nougat-mr1-wear-release/include/linux/qnpn/qnpn-adc.h</p>
a storage circuit configured to store said event;	<p>The accused product comprises a storage circuit (e.g., L2 cache) configured to store said event (e.g., if state is high or low).</p> <p>As shown below, the Snapdragon 835 includes an L2 cache that stores voltage variance events.</p>

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	 <p>The diagram illustrates the Qualcomm Snapdragon 835 processor architecture. It features a central processor die with various components labeled, including the Kryo 280 CPU, Adreno 540 GPU, and Spectra 180 Camera. To the left, the 'Performance' cluster is highlighted with four orange CPU blocks, indicating 'Up to 2.45GHz' and '2MB L2' cache, and a '20% performance uplift' over a range of use cases. To the right, the 'Efficiency' cluster is highlighted with four orange CPU blocks, indicating '1.8GHz' and '1MB L2' cache, and that '80% of time is spent on efficiency cluster'. A red box at the bottom right notes 'Minimized memory transaction power with larger L2 cache'. A URL is provided at the bottom: https://www.androidauthority.com/qualcomm-details-snapdragon-835-735688/</p>
a table configured to store a plurality of event types; and	<p>The accused product comprises a table (e.g., a table containing various thresholds) configured to store a plurality of event types (e.g., if state is high or low).</p> <p>As shown in the code below, the Snapdragon 835 utilizes a table that defines various voltage conditions and their corresponding thresholds.</p>

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<pre> 5006. qcom,bcl { 5007. compatible = "qcom,bcl"; 5008. qcom,bcl-enable; 5009. qcom,bcl-framework-interface; 5010. qcom,bcl-freq-control-list = <0x1a 0x1b 0x1c 0x1d>; 5011. qcom,bcl-hotplug-list = <0x1a 0x1b 0x1c 0x1d>; 5012. qcom,bcl-soc-hotplug-list = <0x1a 0x1b 0x1c 0x1d>; 5013. 5014. qcom,ibat-monitor { 5015. qcom,low-threshold-uamp = <0x33e140>; 5016. qcom,high-threshold-uamp = <0x401640>; 5017. qcom,mitigation-freq-khz = <0x8ca00>; 5018. qcom,vph-high-threshold-uv = <0x3567e0>; 5019. qcom,vph-low-threshold-uv = <0x325aa0>; 5020. qcom,soc-low-threshold = <0xa>; 5021. qcom,thermal-handle = <0xa0>; 5022. }; 5023. }; </pre> <p>https://pastebin.com/U0i7nP4P</p>

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<pre> 5014. qcom,ibat-monitor { 5015. qcom,low-threshold-uamp = <0x33e140>; 5016. qcom,high-threshold-uamp = <0x401640>; 5017. qcom,mitigation-freq-khz = <0x8ca00>; 5018. qcom,vph-high-threshold-uv = <0x3567e0>; 5019. qcom,vph-low-threshold-uv = <0x325aa0>; 5020. qcom,soc-low-threshold = <0xa>; 5021. qcom,thermal-handle = <0xa0>; 5022. }; 5023. }; </pre> <p>https://pastebin.com/U0i7nP4P</p>
<p>a circuit configured to (i) reset when said event condition is a first predetermined type and (ii) implement recover action when said event condition is a second predetermined type, wherein said first and second predetermined types are determined in response to a comparison of said event to said plurality of event types stored in said table.</p>	<p>The accused product comprises a circuit (e.g., resource power manager circuit) configured to (i) reset (e.g., cpu_down) when said event condition is a first predetermined type (e.g., when bcl_soc_state == BCL_LOW_THRESHOLD OR bcl_vph_state == BCL_LOW_THRESHOLD) and (ii) implement recover action (e.g., cpu_up) when said event condition is a second predetermined type (e.g., when bcl_soc_state is not equal to BCL_LOW_THRESHOLD, bcl_vph_state is not equal to BCL_LOW_THRESHOLD and bcl_ibat_state is not equal to BCL_HIGH_THRESHOLD), wherein said first and second predetermined types are determined in response to a comparison of said event to said plurality of event types stored in said table (e.g. the comparison of collected values with stored thresholds).</p>

Pat. 6,819,539	<p data-bbox="565 573 1357 600">Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")</p> <p data-bbox="565 604 906 632">4 Resource Power Manager (RPM)</p> <p data-bbox="565 636 581 663">5</p> <p data-bbox="565 667 1409 919">6 <u>RPM is a dedicated hardware engine for managing shared SoC resources,</u> 7 <u>which includes buses, clocks, power rails, etc. The goal of RPM is</u> 8 <u>to achieve the maximum power savings while satisfying the SoC's</u> 9 <u>operational and performance requirements.</u> RPM accepts resource 10 requests from multiple RPM masters. It arbitrates and aggregates the 11 requests, and configures the shared resources. The RPM masters are 12 the application processor, the modem processor, as well as some 13 hardware accelerators.</p> <p data-bbox="443 930 1442 957">https://android.googlesource.com/kernel/msm/+android-7.1.0_r0.2/Documentation/arm/msm/rpm.txt</p>  <p data-bbox="443 1329 1425 1381">https://www.slideshare.net/linaroorg/lcu14-210-qualcomm-snapdragon-power-management-unique-challenges-for-power-frameworks</p>
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Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<pre> 213 #ifdef CONFIG_SMP 214 static void __ref bcl_handle_hotplug(struct work_struct *work) 215 { 216 int ret = 0, _cpu = 0; 217 218 mutex_lock(&bcl_hotplug_mutex); 219 if (cpumask_empty(bcl_cpu_online_mask)) 220 bcl_update_online_mask(); 221 222 if (bcl_soc_state == BCL_LOW_THRESHOLD 223 bcl_vph_state == BCL_LOW_THRESHOLD) 224 bcl_hotplug_request = bcl_soc_hotplug_mask; 225 else if (bcl_ibat_state == BCL_HIGH_THRESHOLD) 226 bcl_hotplug_request = bcl_hotplug_mask; 227 else 228 bcl_hotplug_request = 0; 229 230 for_each_possible_cpu(_cpu) { 231 if (!(bcl_hotplug_mask & BIT(_cpu)) 232 && !(bcl_soc_hotplug_mask & BIT(_cpu))) 233 !(cpumask_test_cpu(_cpu, bcl_cpu_online_mask))) 234 continue; 235 236 if (bcl_hotplug_request & BIT(_cpu)) { 237 if (!cpu_online(_cpu)) 238 continue; 239 ret = cpu_down(_cpu); 240 if (ret) </pre> <p>Event condition is a first predetermined type</p> <p>Reset</p> <p>https://android.googlesource.com/kernel/msm/+refs/heads/android-msm-angler-3.10-nougat/drivers/power/battery_current_limit.c</p>

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<pre> 214 static void __ref bcl_handle_hotplug(struct work_struct *work) 215 { 216 int ret = 0, _cpu = 0; 217 218 mutex_lock(&bcl_hotplug_mutex); 219 if (cpumask_empty(bcl_cpu_online_mask)) 220 bcl_update_online_mask(); 221 222 if (bcl_soc_state == BCL_LOW_THRESHOLD 223 bcl_vph_state == BCL_LOW_THRESHOLD) 224 bcl_hotplug_request = bcl_soc_hotplug_mask; 225 else if (bcl_ibat_state == BCL_HIGH_THRESHOLD) 226 bcl_hotplug_request = bcl_hotplug_mask; 227 else 228 bcl_hotplug_request = 0; 229 230 for_each_possible_cpu(_cpu) { 231 if (!(bcl_hotplug_mask & BIT(_cpu)) 232 && !(bcl_soc_hotplug_mask & BIT(_cpu)) 233 !cpumask_test_cpu(_cpu, bcl_cpu_online_mask)) 234 continue; 235 236 if (bcl_hotplug_request & BIT(_cpu)) { 237 if (!cpu_online(_cpu)) 238 continue; 239 ret = cpu_down(_cpu); 240 if (ret) 241 pr_err("Error %d offlining core %d\n", 242 ret, _cpu); 243 else 244 pr_debug("Set Offline CPU:%d\n", _cpu); 245 } else { 246 if (cpu_online(_cpu)) 247 continue; 248 ret = cpu_up(_cpu); 249 if (ret) </pre> <p>Event condition is a second predetermined type</p> <p>Event condition is a second predetermined type</p> <p>Recover</p> <p>https://android.googlesource.com/kernel/msm/+refs/heads/android-msm-angler-3.10-nougat/drivers/power/battery_current_limit.c</p>

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<pre> 5014. qcom,ibat-monitor { 5015. 5016. qcom,low-threshold-uamp = <0x33e140>; 5017. qcom,high-threshold-uamp = <0x401640>; 5018. qcom,mitigation-freq-khz = <0x8ca00>; 5019. qcom,vph-high-threshold-uv = <0x3567e0>; 5020. qcom,vph-low-threshold-uv = <0x325aa0>; 5021. qcom,soc-low-threshold = <0xa>; 5022. qcom,thermal-handle = <0xa0>; 5023. }; </pre> <p>https://pastebin.com/U0i7nP4P</p> <p>Threshold Values from the table (dtsi) are imported into the battery_current_limit module thru a record data type (bcl).</p>

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1519 1520 1521 1522 1523 1524 1525 1526 1527 1528 1529 1530 1531	<div data-bbox="613 625 1463 1031" style="border: 2px solid red; padding: 10px;"> <pre> BCL_FETCH_DT_U32(ibat_node, key, "qcom,low-threshold-uamp", ret, bcl->ibat_low_thresh.trip_value, ibat_probe_exit); BCL_FETCH_DT_U32(ibat_node, key, "qcom,high-threshold-uamp", ret, bcl->ibat_high_thresh.trip_value, ibat_probe_exit); BCL_FETCH_DT_U32(ibat_node, key, "qcom,mitigation-freq-khz", ret, bcl->bcl_p_freq_max, ibat_probe_exit); BCL_FETCH_DT_U32(ibat_node, key, "qcom,vph-high-threshold-uv", ret, bcl->vbat_high_thresh.trip_value, ibat_probe_exit); BCL_FETCH_DT_U32(ibat_node, key, "qcom,vph-low-threshold-uv", ret, bcl->vbat_low_thresh.trip_value, ibat_probe_exit); BCL_FETCH_DT_U32(ibat_node, key, "qcom,soc-low-threshold", ret, soc_low_threshold, ibat_probe_exit); </pre> </div> <p data-bbox="440 1073 1484 1129">The values of the table are now inside the record, bcl. The State of Charge low threshold is saved in a variable soc_low_threshold.</p> <div data-bbox="630 1161 1284 1381" style="border: 2px solid red; padding: 10px;"> <pre> 174 /* BCL Peripheral monitor parameters */ 175 struct bcl_threshold ibat_high_thresh; 176 struct bcl_threshold ibat_low_thresh; 177 struct bcl_threshold vbat_high_thresh; 178 struct bcl_threshold vbat_low_thresh; 179 uint32_t bcl_p_freq_max; 180 }; </pre> </div> <div data-bbox="813 1402 1195 1446" style="border: 2px solid red; padding: 5px; text-align: center; margin-top: 10px;"> Different possible event types </div> <p data-bbox="440 1461 1284 1514"> https://android.googlesource.com/kernel/msm/+refs/heads/android-msm-angler-3.10-nougat/drivers/power/battery_current_limit.c </p>

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<pre> 17 #define BCL_NAME_MAX_LEN 20 18 19 enum bcl_trip_type { 20 BCL_HIGH_TRIP, 21 BCL_LOW_TRIP, 22 BCL_TRIP_MAX, 23 }; </pre> <p>https://android.googlesource.com/kernel/msm/+refs/heads/android-msm-angler-3.10-nougat/include/linux/msm_bcl.h</p> <pre> 31 struct bcl_threshold { 32 int trip_value; 33 enum bcl_trip_type type; 34 void *trip_data; 35 void (*trip_notify)(enum bcl_trip_type, int, void *); 36 }; </pre>

Pat. 6,819,539	Verizon's Sale of the Motorola Moto Z3 ("The Accused Instrumentalities")
	<pre> 214 static void __ref bcl_handle_hotplug(struct work_struct *work) 215 { 216 int ret = 0, _cpu = 0; 217 218 mutex_lock(&bcl_hotplug_mutex); 219 if (cpumask_empty(bcl_cpu_online_mask)) 220 bcl_update_online_mask(); 221 222 if (bcl_soc_state == BCL_LOW_THRESHOLD 223 bcl_vph_state == BCL_LOW_THRESHOLD) 224 bcl_hotplug_request = bcl_soc_hotplug_mask; 225 else if (bcl_ibat_state == BCL_HIGH_THRESHOLD) 226 bcl_hotplug_request = bcl_hotplug_mask; 227 else 228 bcl_hotplug_request = 0; 229 230 for_each_possible_cpu(_cpu) { 231 if (!(bcl_hotplug_mask & BIT(_cpu)) 232 && !(bcl_soc_hotplug_mask & BIT(_cpu)) 233 !cpumask_test_cpu(_cpu, bcl_cpu_online_mask)) 234 continue; 235 236 if (bcl_hotplug_request & BIT(_cpu)) { 237 if (!cpu_online(_cpu)) 238 continue; 239 ret = cpu_down(_cpu); </pre> <p>https://android.googlesource.com/kernel/msm/+refs/heads/android-msm-angler-3.10-nougat/drivers/power/battery_current_limit.c</p> <p>The new values of bcl_vph_state and bcl_ibat_state are compared against the threshold values from the table.</p>

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